



AMD Athlon™ 64 Processor 3400+ for Notebooks Competitive Performance Guide



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About This Document

This document is intended for use by those who are interested in AMD64 performance as demonstrated by the AMD Athlon™ 64 3400+ for notebooks. The performance of the processor is shown as an average of all of the tests and as averages of compiled data from benchmarks in the following categories:

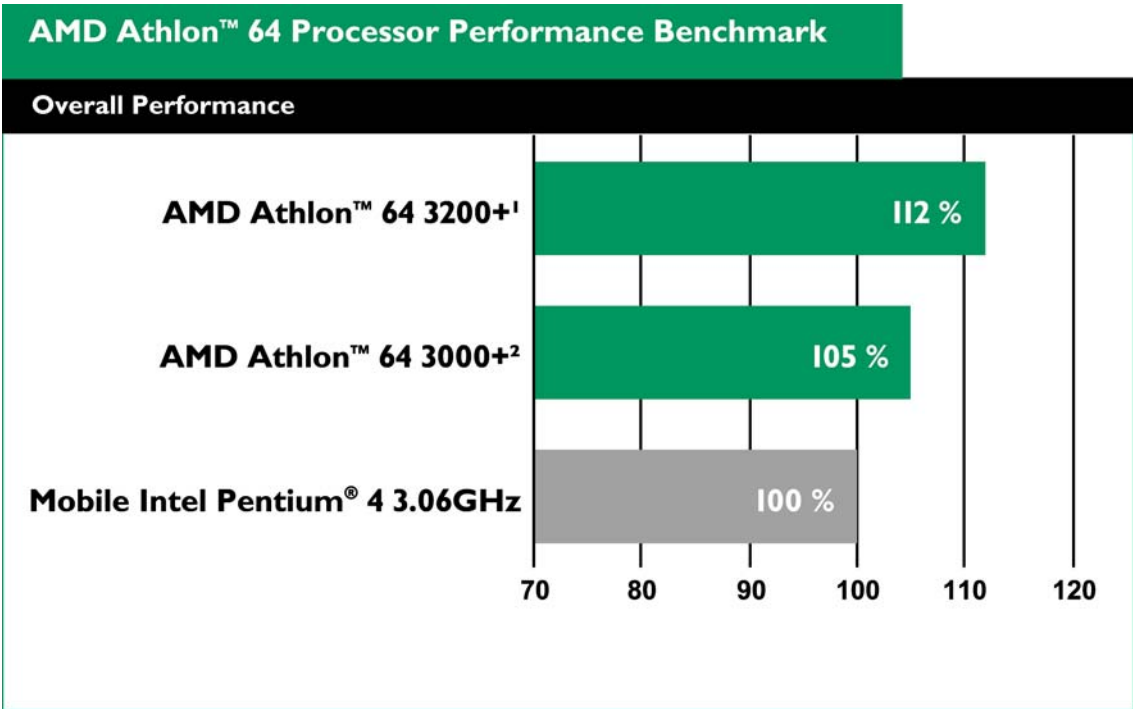
- Office Productivity
- Digital Media
- 3D Gaming

The result of each individual benchmark is shown in a graphical format. The system configurations are also listed at the end of this document. For a detailed benchmarking methodology, including step-by-step procedures on how to duplicate these results, refer to *AMD Processor Performance Evaluation Guide*, order# 30579.

Notebook Performance Overall

The AMD Athlon™ 64 processor for notebooks delivers the most advanced PC processor available for high-performance desktop-replacement notebook PC. This processor provides leading-edge performance for today's demanding software like digital video, audio, imaging editing, 3D gaming, as well as office applications.

The AMD Athlon 64 processor features AMD64 technology for the coming wave of 64-bit applications. Plus, AMD PowerNow!™ technology enables extended battery life for your notebook computer and can provide for a quieter user experience.



¹This model number indicates relative software performance among AMD processors.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

While there is no simple way to measure performance that covers every user experience, AMD has compiled an average of all the benchmarks listed on page 4. Figure shows how the AMD Athlon 64 processor performs overall relative to the Intel Pentium® 4 processor running at 3.2 GHz.

Overall processor performance is an average of the compiled data from the list of overall benchmark scores from the following tests:

Office Productivity

- Ziff Davis Media Inc. Business Winstone® 2004 v1.0
- Ziff Davis Media Inc. Business Winstone® 2004 v1.0 Multitasking Tests
- BAPCO® SYSmark® 2004 Office Productivity
- WinRAR

Digital Media

- Ziff Davis Media Inc. Multimedia Content Creation Winstone® 2004 v1.0
- BAPCO® SYSmark® 2004 Internet Content Creation
- AVI to MPEG2 Conversion with bbMPEG and AVI2MPEG2
- MPEG2 to MPEG4 Conversion with Xmpeg 5.02 and DivX (Pro 5.03 bundle)
- RazorLAME 1.1.5 MP3 Encoder

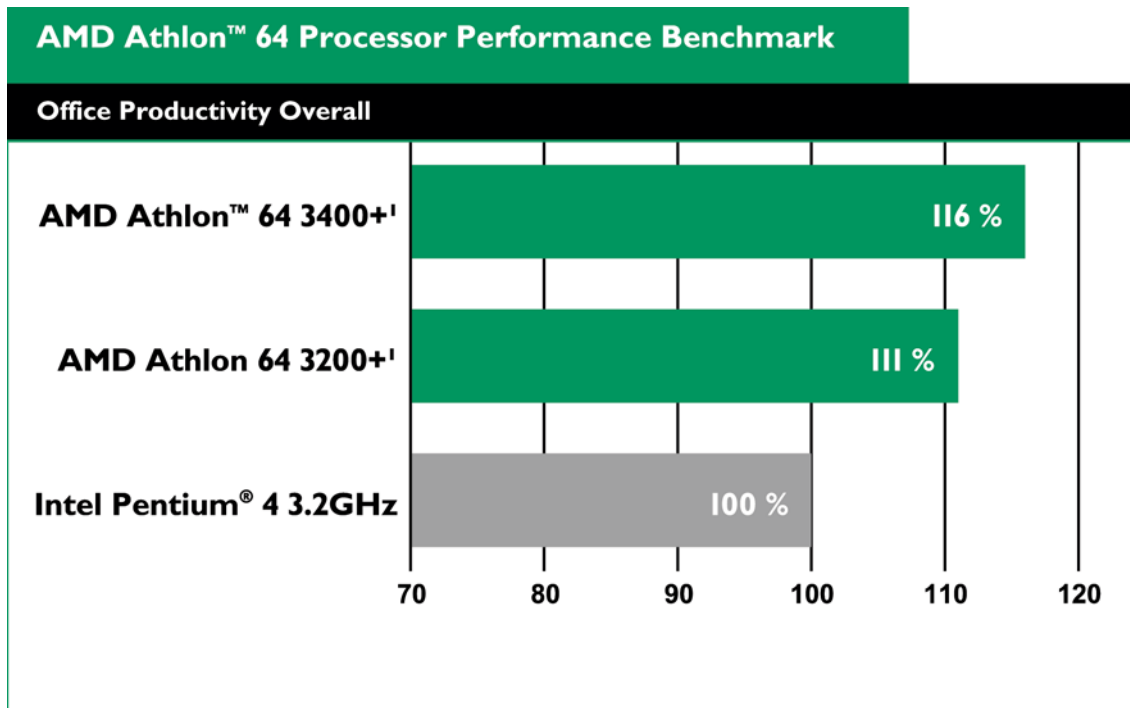
3D Gaming (all tests performed at 1024x768x32 resolution)

- 3DMark® 2001SE PRO (D3D Hardware T&L) by MadOnion
- 3DMark® 2001SE PRO (D3D Software T&L)
- 3DMark® 03 Pro (Software Vertex Shaders) by Futuremark® Corporation
- 3DMark® 03 Pro (Hardware Vertex Shaders) by Futuremark® Corporation
- AquaMark3
- Comanche 4 Demo
- Half-Life Smokin'
- Jedi Knights II Demo
- Quake III Arena Demo2
- Return to Castle Wolfenstein 3D
- Splinter Cell (1_1_1)
- Splinter Cell (1_1_2)
- Unreal Tournament 2003 Demo BotMatch
- Unreal Tournament 2003 Demo Flyby

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Office Productivity Overall

The AMD Athlon™ 64 processor for notebooks effortlessly runs multiple applications at the same time that helps to minimize work stoppage and interruptions. It allows you to operate your system more efficiently when multitasking and helps improve overall productivity in your notebook system.



¹This model number indicates relative software performance among AMD processors.

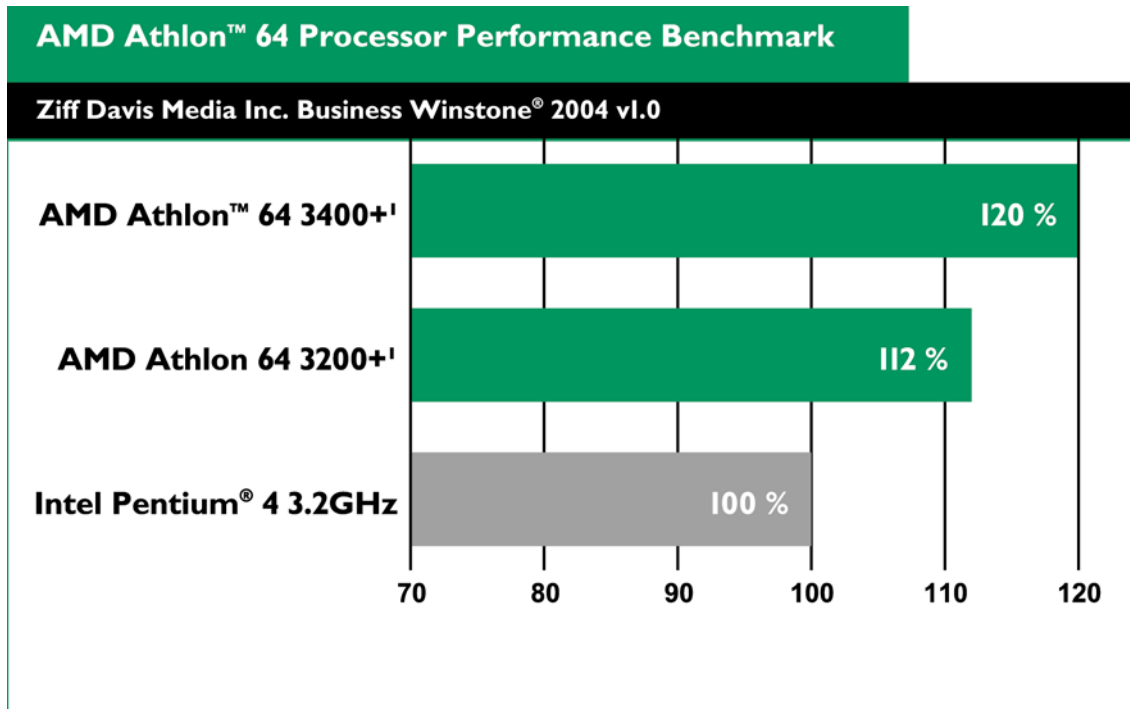
The score is normalized to the Intel Pentium® 4 processor. This benchmark is an average of compiled data from the list of benchmark scores from the tests listed below:

- Ziff Davis Media Inc. Business Winstone® 2004 v1.0
- Ziff Davis Media Inc. Business Winstone® 2004 v1.0 Multitasking Tests
- BAPCO® SYSmark® 2004 Office Productivity
- WinRAR

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Ziff Davis Media Inc. Business Winstone® 2004 v1.0

Business Winstone is a system-level, application-based benchmark that measures a PC's overall performance when running today's top-selling Windows® operating system-based applications. Business Winstone does not mimic what these packages do; it runs real applications through a series of scripted activities and uses the time a PC takes to complete those activities to produce its performance scores.



¹ This model number indicates relative software performance among AMD processors.

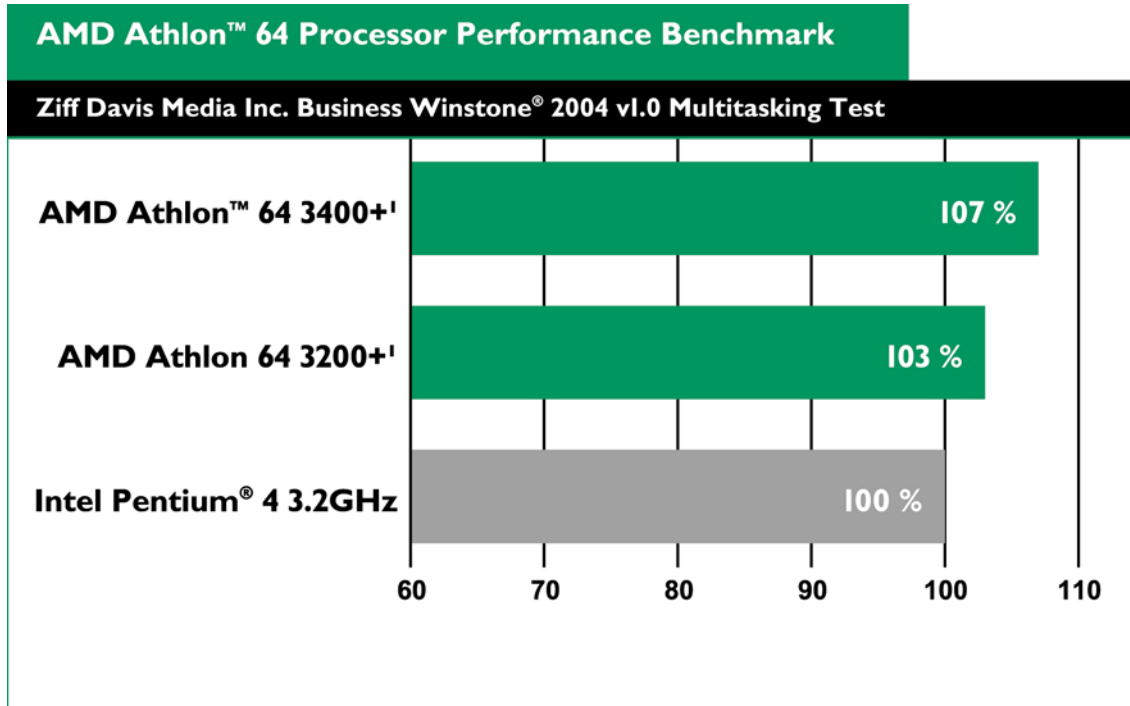
The score is normalized to the Intel Pentium 4 processor. The Business Winstone benchmark uses the following applications.

- Microsoft® Internet Explorer 6
- Microsoft Outlook 2002 SP-2
- Microsoft Project 2002
- Microsoft Access 2002 SP-2
- Microsoft PowerPoint 2002 SP-2
- Microsoft Excel 2002 SP-2
- Microsoft FrontPage 2002 SP-2
- Microsoft Word 2002 SP-2
- Norton AntiVirus Professional Edition 2003
- WinZip 8.1 SR-1

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Ziff Davis Media Inc. Business Winstone® 2004 v1.0 Multitasking Tests

Business Winstone Multitasking test uses the same applications as Business Winstone, but runs some of the applications in the background while doing work in the foreground. If you're the type of person who runs a virus check in the background while you use Office applications in the foreground, you'll want to check out this test.



¹This model number indicates relative software performance among AMD processors.

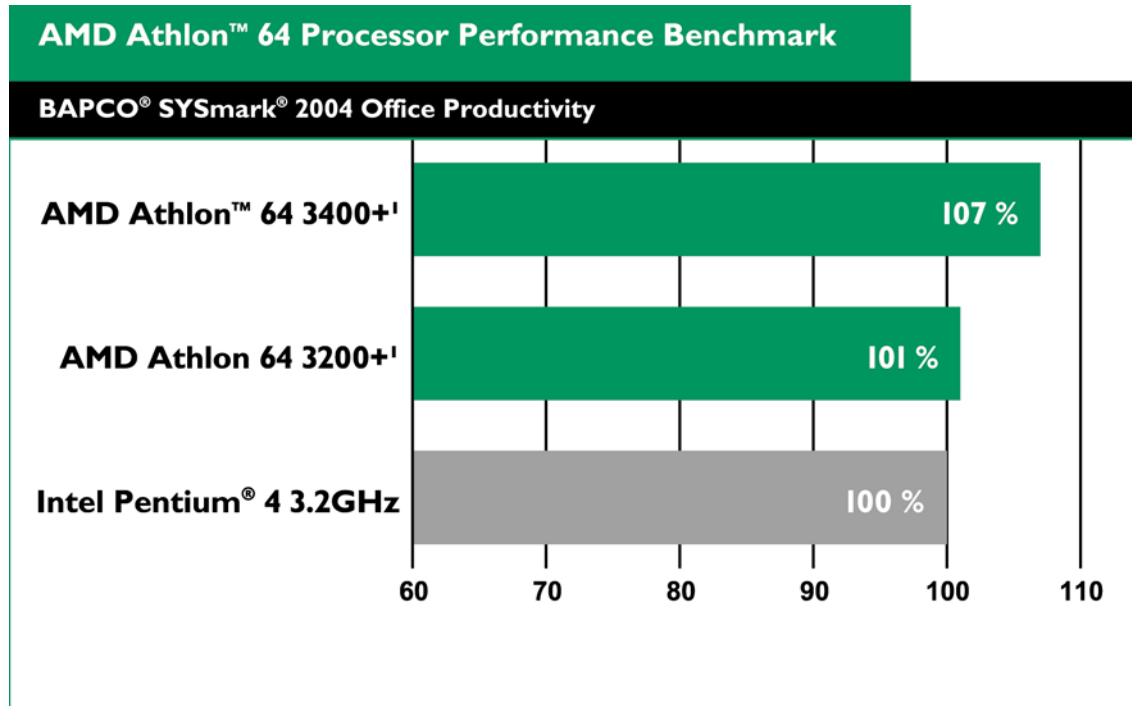
The score is normalized to the Intel Pentium 4 processor. The Business Winstone Multitasking benchmark uses the following applications:

- Microsoft® Internet Explorer 6
- Microsoft Outlook 2002 SP-2
- Microsoft Project 2002
- Microsoft Access 2002 SP-2
- Microsoft PowerPoint 2002 SP-2
- Microsoft Excel 2002 SP-2
- Microsoft FrontPage 2002 SP-2
- Microsoft Word 2002 SP-2
- Norton AntiVirus Professional Edition 2003
- WinZip 8.1 SR-1

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

BAPCO® SYSmark® 2004 Office Productivity

The BAPCO® SYSmark® 2004 is an application-based benchmark.



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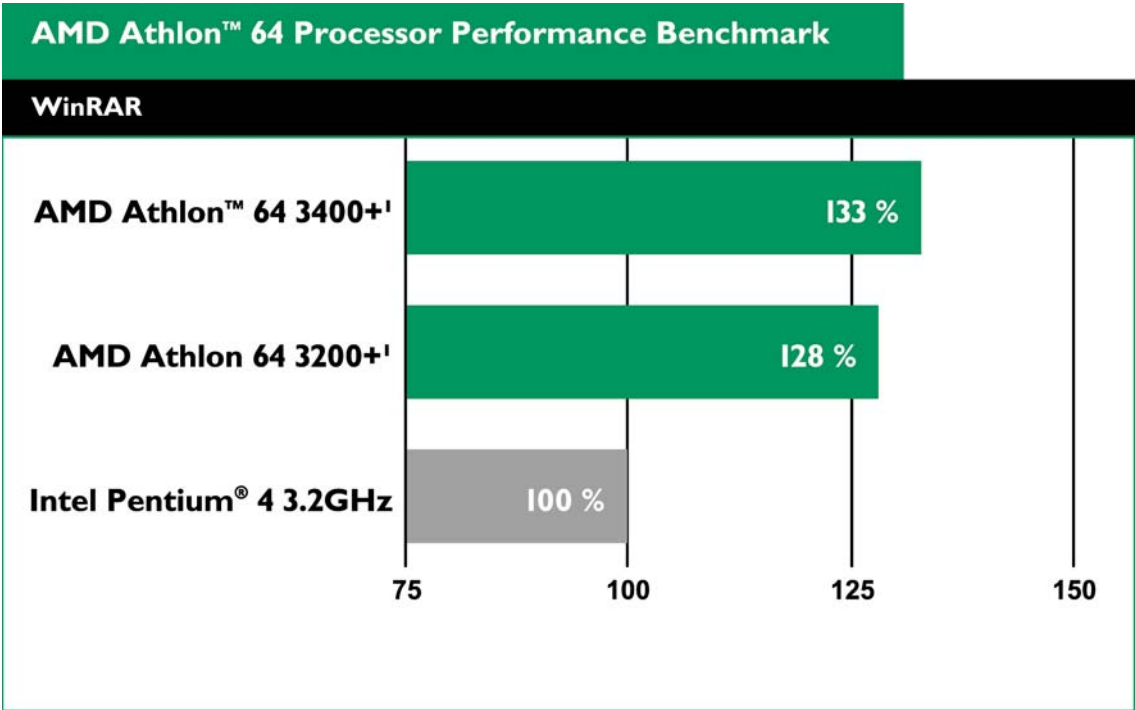
The score is normalized to the Intel Pentium 4 processor. The BAPCO SYSmark benchmark uses the following applications.

- Adobe® Acrobat® 5.0.5
- Microsoft® Access 2002
- Microsoft Excel 2002
- Microsoft Internet Explorer 6
- Microsoft Outlook 2002
- Microsoft PowerPoint 2002
- Microsoft Word 2002
- Network Associates M^cAfee VirusScan 7.0
- ScanSoft Dragon Naturally Speaking 6 Preferred
- WinZip Computing WinZip 8.1

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

WinRAR

WinRAR is archive management software. WinRAR may be used to backup your data and reduce size of e-mail attachments, decompress RAR, ZIP and other files downloaded from Internet and create new archives in RAR and ZIP file format.



¹This model number indicates relative software performance among AMD processors.

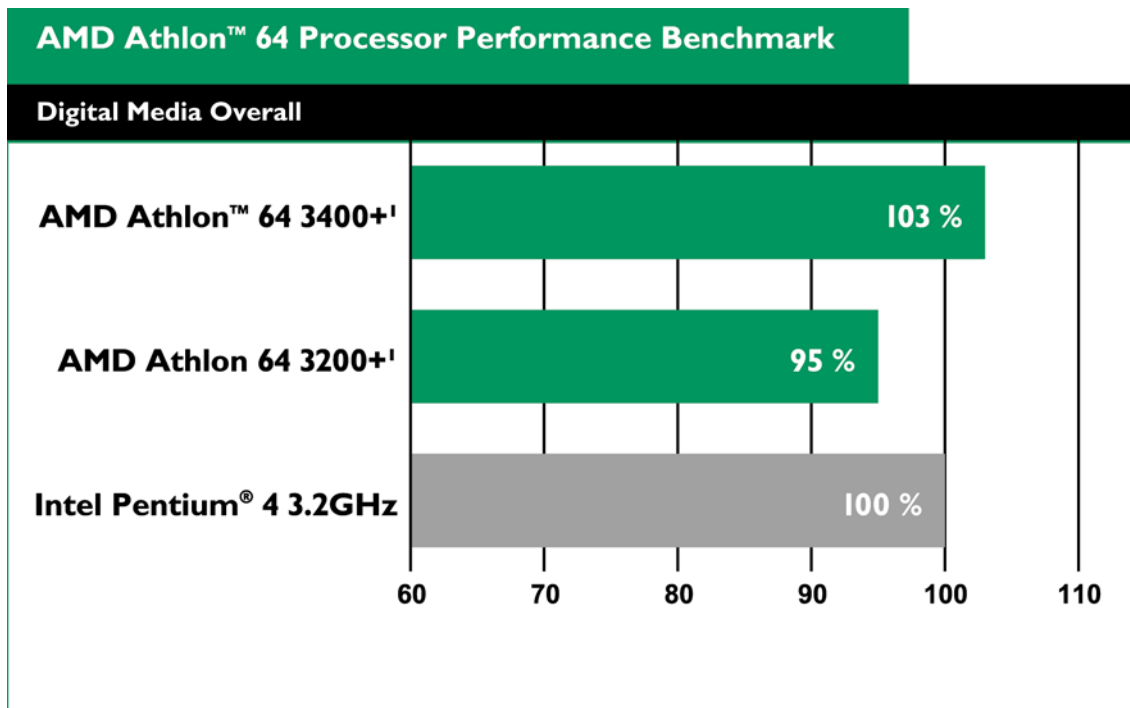
The score is normalized to the Intel Pentium 4 processor. This benchmark is the compiled data from the WinRAR benchmark scores.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Digital Media Overall

Digital Media Overall Results

With a revolutionary processor design and support for both 3DNow!™ Professional technology and SSE2 instructions, the AMD Athlon™ 64 processor provides outstanding performance for multimedia applications in a notebook system. Compose, edit, and encode digital audio, video, and image files quickly and smoothly so you can save time and produce outstanding work.



¹ This model number indicates relative software performance among AMD processors.

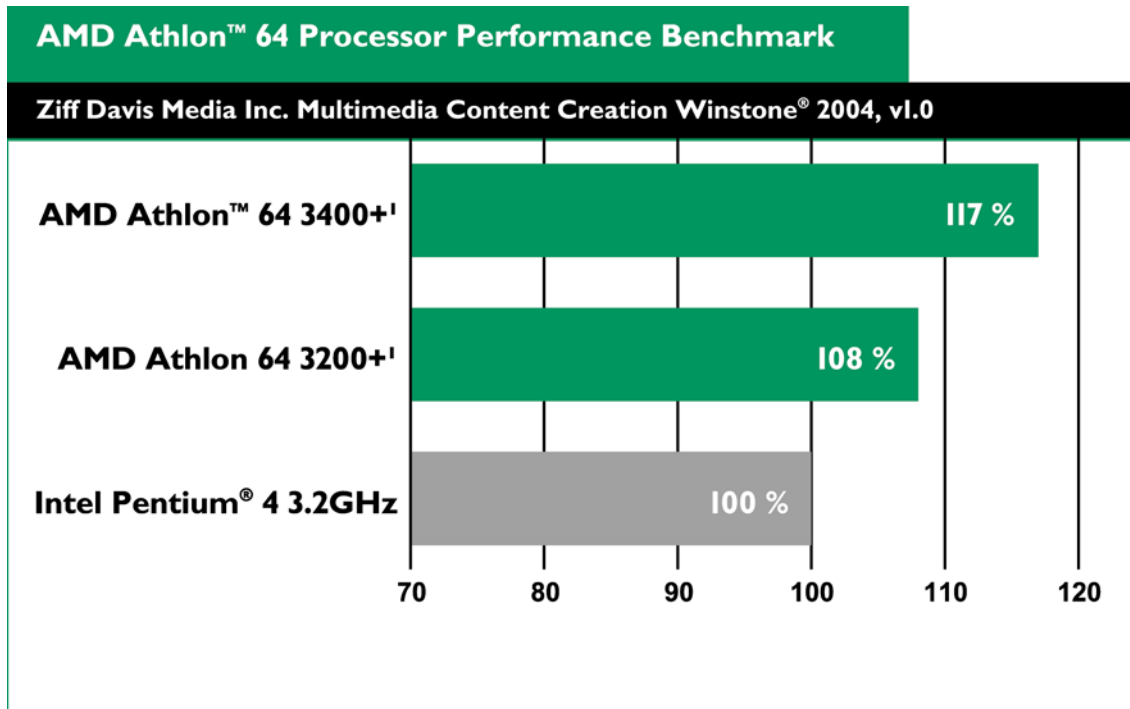
This benchmark is an average of compiled data from the list of benchmark scores from the tests listed below. The score is normalized to the Intel Pentium® 4 processor.

- Ziff Davis Media Inc. Multimedia Content Creation Winstone® 2004 v1.0
- BAPCO® SYSmark® 2004 Internet Content Creation
- AVI to MPEG2 Conversion with bbMPEG and AVI2MPEG2
- MPEG2 to MPEG4 Conversion with Xmpeg 5.02 and DivX (Pro 5.03 bundle)
- RazorLAME 1.1.5 MP3 Encoder

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Ziff Davis Media Inc. Multimedia Content Creation Winstone® 2004 v1.0

Multimedia Content Creation Winstone® is a system-level, application-based benchmark that measures a PC's overall performance when running top, Windows® operating system-based multimedia content creation applications.



¹This model number indicates relative software performance among AMD processors.

The score is normalized to the Intel Pentium 4 processor. Multimedia Content Creation Winstone 2004 uses the following applications:

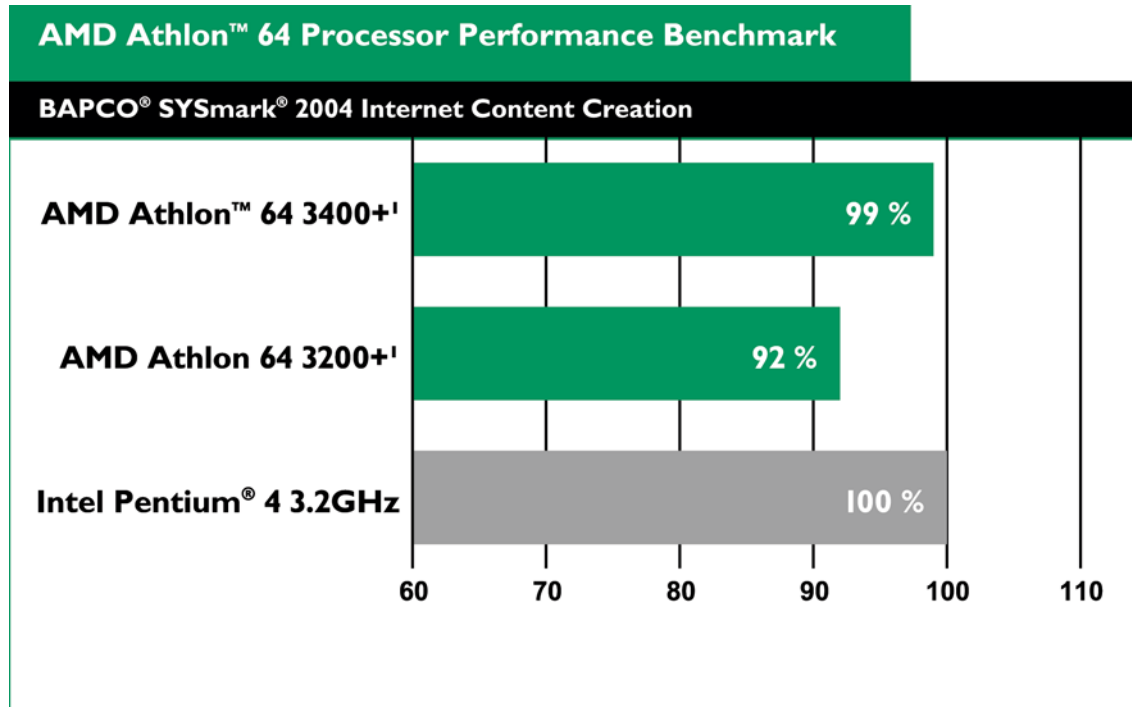
- Adobe® Photoshop® 7.0.1
- Adobe Premiere 6.50
- Macromedia Director MX 9.0
- Macromedia Dreamweaver MX 6.1
- Microsoft® Windows® Media Encoder 9 Version 9.00.00.2980
- NewTek's LightWave 3D 7.5b
- Steinberg WaveLab 4.0f

Multimedia Content Creation Winstone 2004 is a single large test that runs the above applications through a series of scripted activities and returns a single score.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

BAPCO® SYSmark® 2004 Internet Content Creation

SYSmark® 2004 is an application-based benchmark.



¹This model number indicates relative software performance among AMD processors.

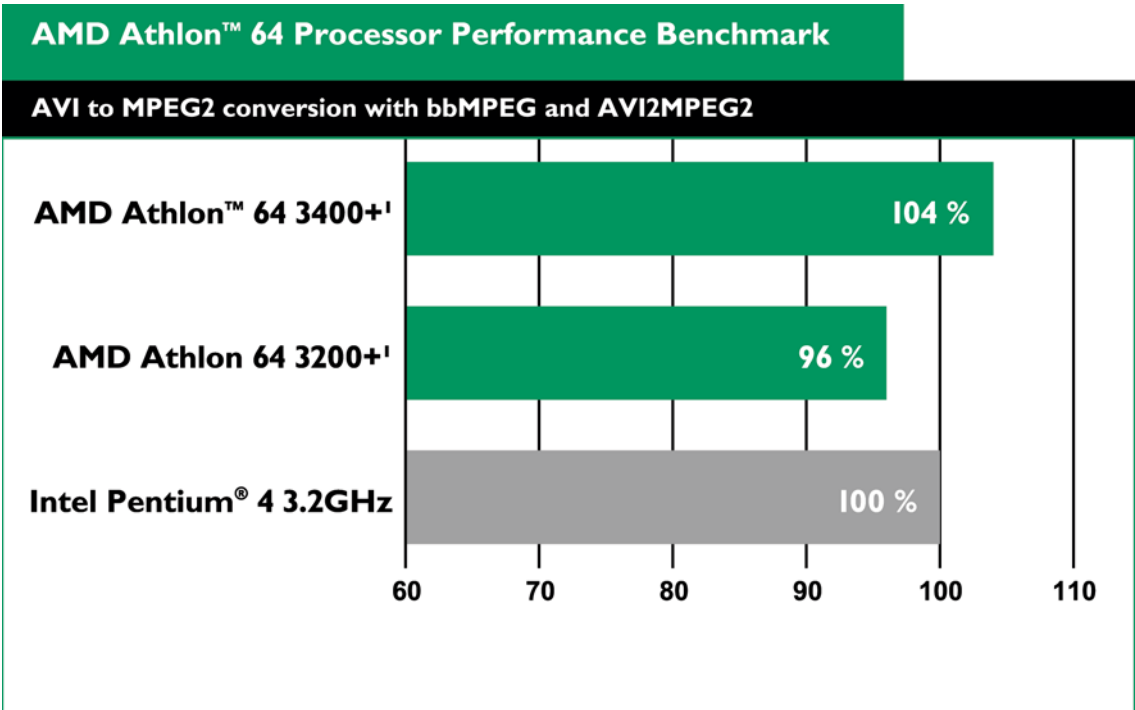
This benchmark incorporates the following Internet Content Creation applications. The score is normalized to the Intel Pentium 4 processor.

- Adobe® After Effects 5.5
- Adobe Photoshop 7.01
- Adobe Premiere 6.5
- Discrete 3ds max 5.1
- Network Associates M^cAfee VirusScan 7.0
- WinZip Computing WinZip 8.1
- Macromedia Dreamweaver MX
- Macromedia Flash MX
- Windows® Media Encoder 9 Series

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

AVI to MPEG2 Conversion with bbMPEG and AVI2MPEG2

This benchmark tests AVI to MPEG2 conversion using bbMPEG and AVI2MPEG2. This benchmark uses bbMPEG and AVI2MPEG2 to convert a 640 MB AVI video file to MPEG2 format.



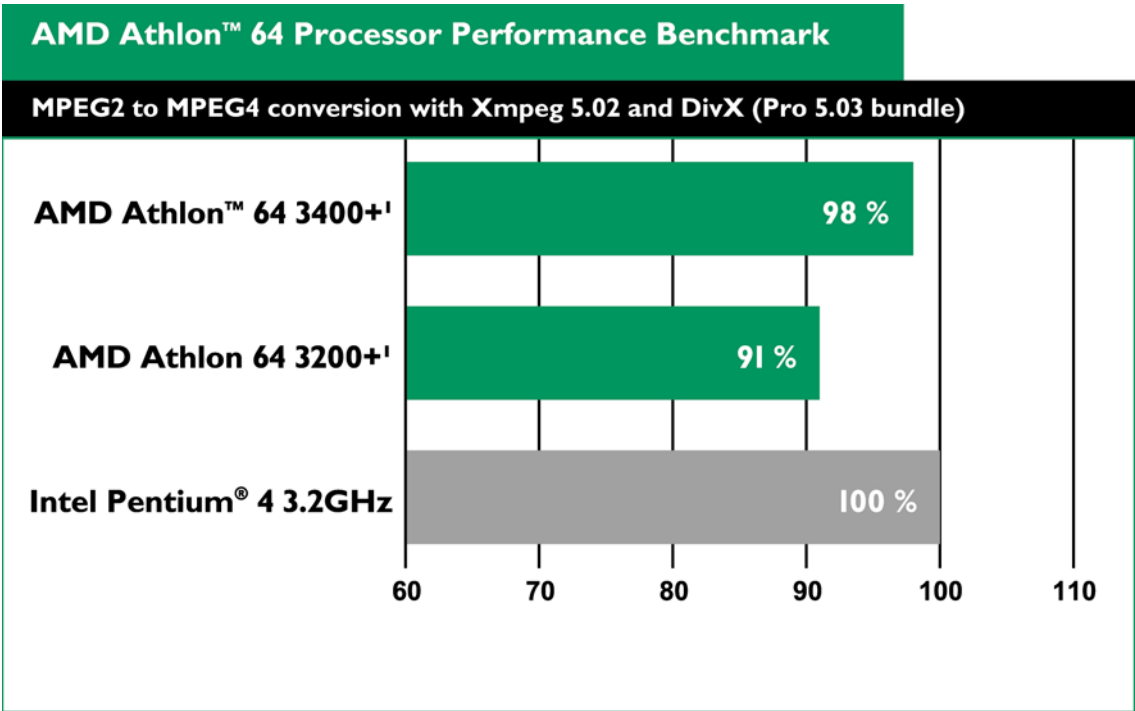
¹This model number indicates relative software performance among AMD processors.

The score is normalized to the Intel Pentium 4 processor. This benchmark is the compiled data from the bbMPEG and AVI2MPEG2 benchmark scores.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

MPEG2 to MPEG4 Conversion with Xmpeg 5.02 and DivX (Pro 5.03 bundle)

This benchmark uses Xmpeg 5.02 and DivX 5.03 Pro to convert the MPEG2 video file created with the AVI to MPEG2 Conversion with bbMPEG and AVI2MPEG2 benchmark. The benchmark creates an MPEG4 file in the DivX format.

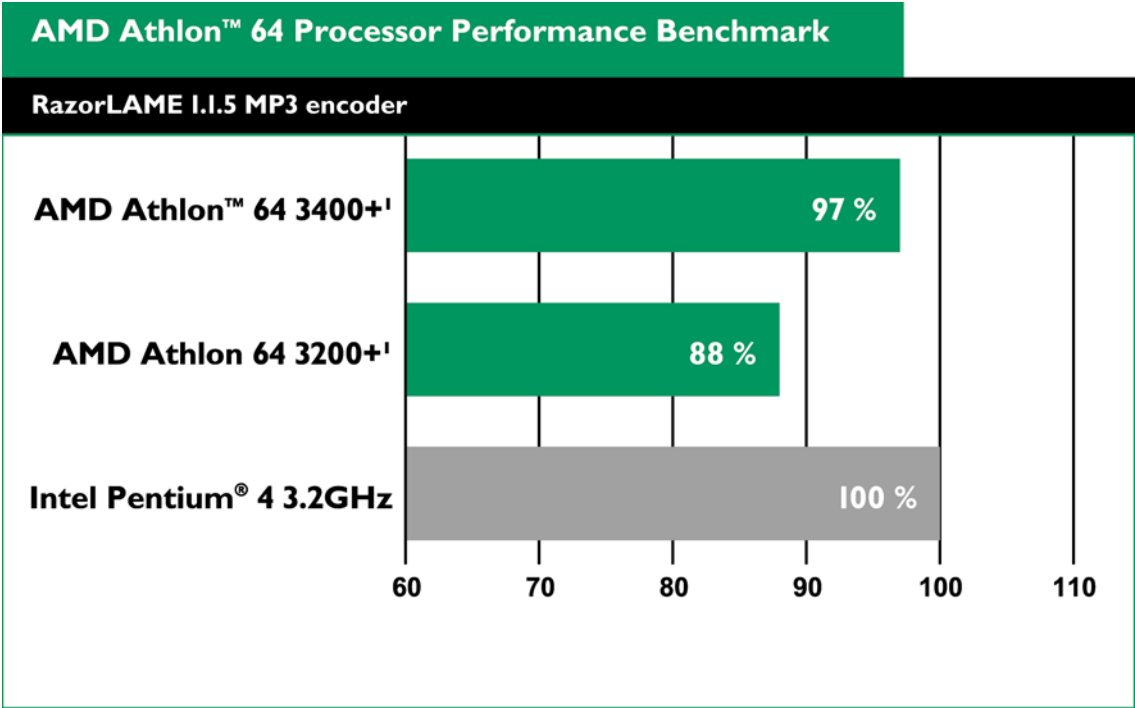


¹This model number indicates relative software performance among AMD processors.

The score is normalized to the Intel Pentium 4 Processor 3.2 GHz. This benchmark is the compiled data from the MPEG2 to MPEG4 benchmark scores.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

RazorLAME 1.1.5 MP3 Encoder



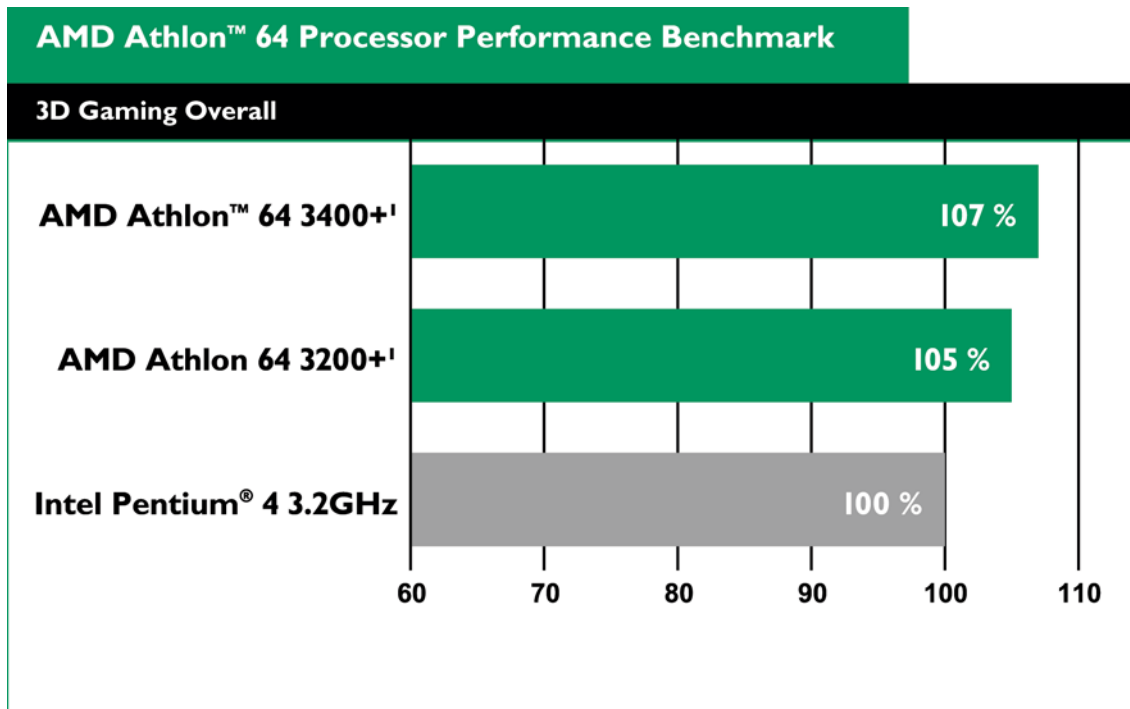
¹This model number indicates relative software performance among AMD processors.

The score is normalized to the Intel Pentium 4 processor. This benchmark is the compiled data from the RazorLAME version 1.1.5 MP3 benchmark scores.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

3D Gaming Overall

The AMD Athlon™ 64 processor's innovative technology enables the ultimate gaming experience in a notebook system. The AMD Athlon 64 processor allows users to escape into a movie-like gaming experience with smooth 3D graphics, rich textures, quick response times, and realistic sound.



¹This model number indicates relative software performance among AMD processors.

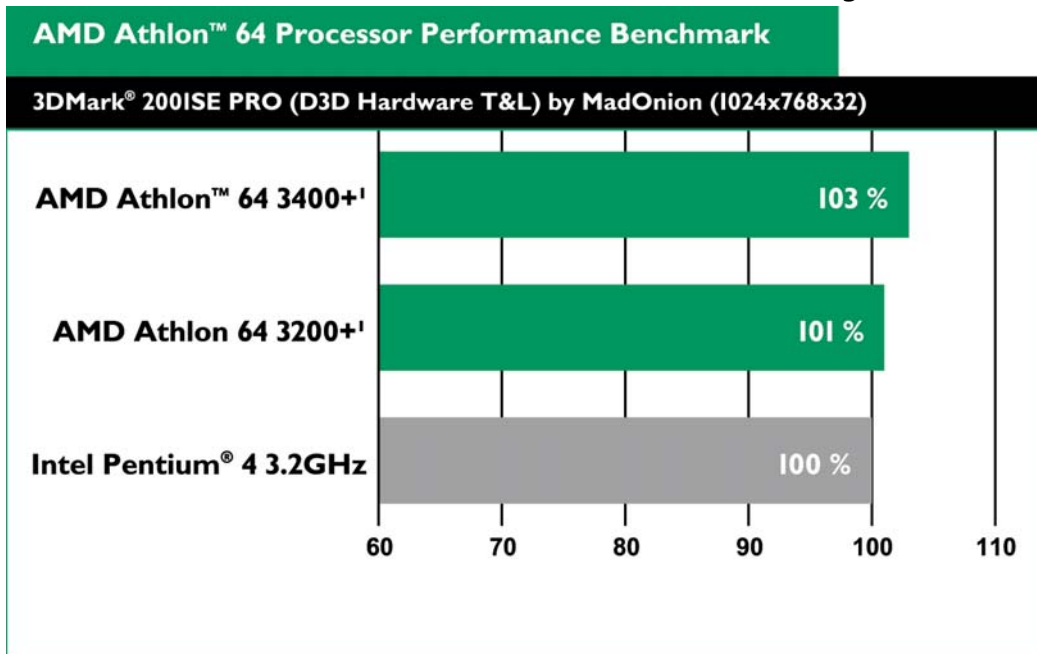
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

This benchmark is an average of compiled data from the list of benchmark scores from the following list of tests. All benchmarks normalize the score to Intel Pentium® 4 processor for the following tests (all at 1024x768x32):

- 3DMark® 2001SE PRO (D3D Hardware T&L) by MadOnion
- 3DMark® 2001SE PRO (D3D Software T&L)
- 3DMark® 03 Pro (Software Vertex Shaders) by Futuremark® Corporation
- 3DMark® 03 Pro (Hardware Vertex Shaders) by Futuremark® Corporation
- AquaMark3
- Comanche 4 Demo
- Half-Life Smokin'
- Jedi Knights II Demo
- Quake III Arena Demo2
- Return to Castle Wolfenstein 3D
- Splinter Cell (1_1_1)
- Splinter Cell (1_1_2)
- Unreal Tournament 2003 Demo BotMatch
- Unreal Tournament 2003 Demo Flyby

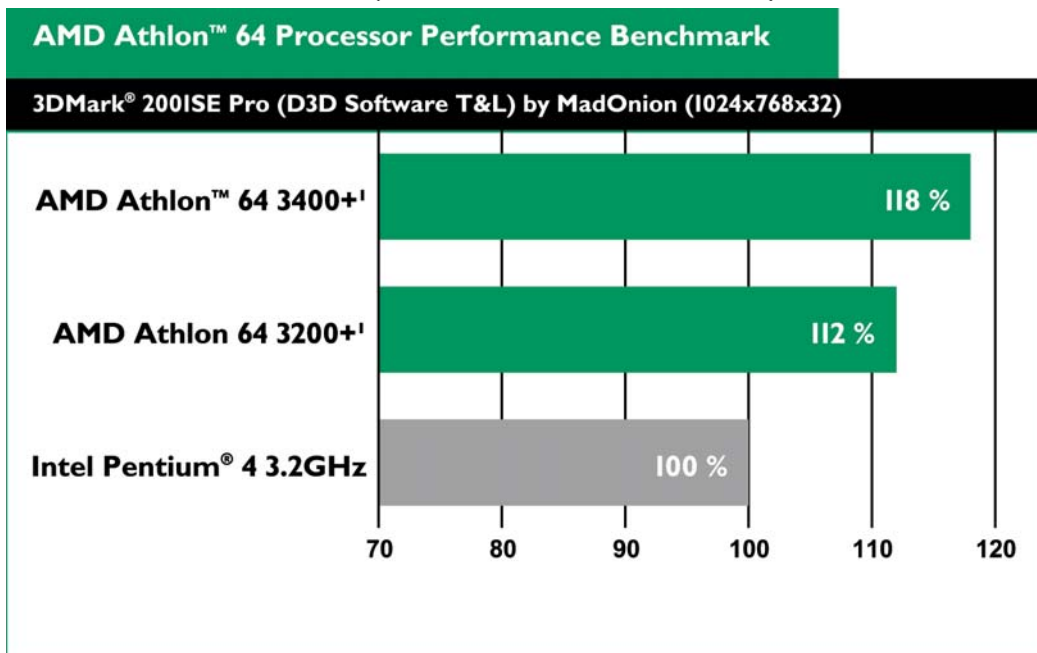
Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

3DMark® 2001SE PRO (D3D Hardware T&L) by MadOnion



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

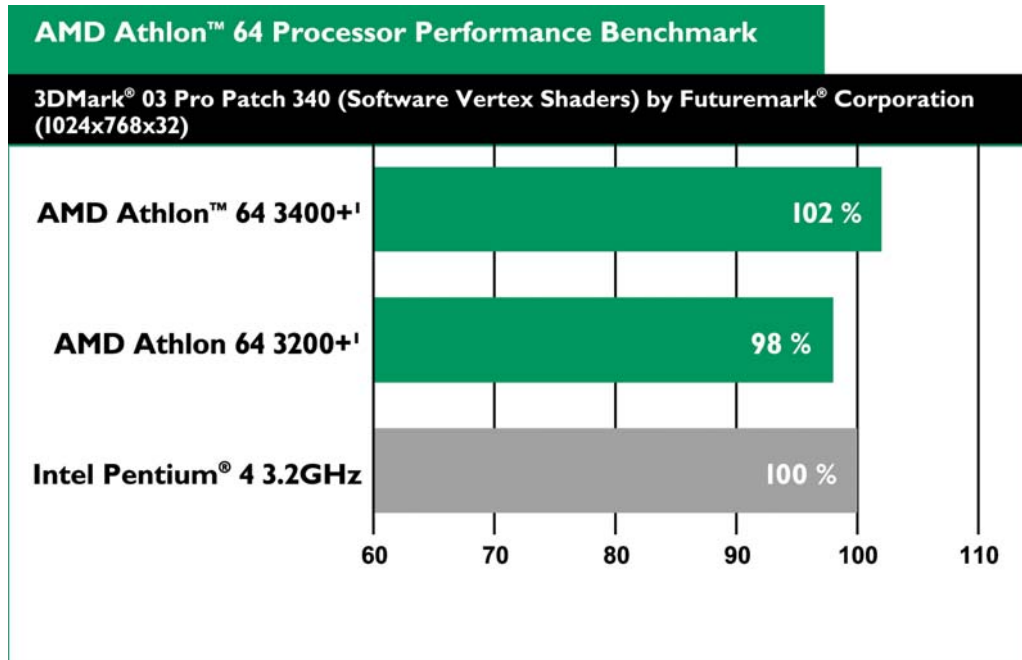
3DMark® 2001SE PRO (D3D Software T&L)



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

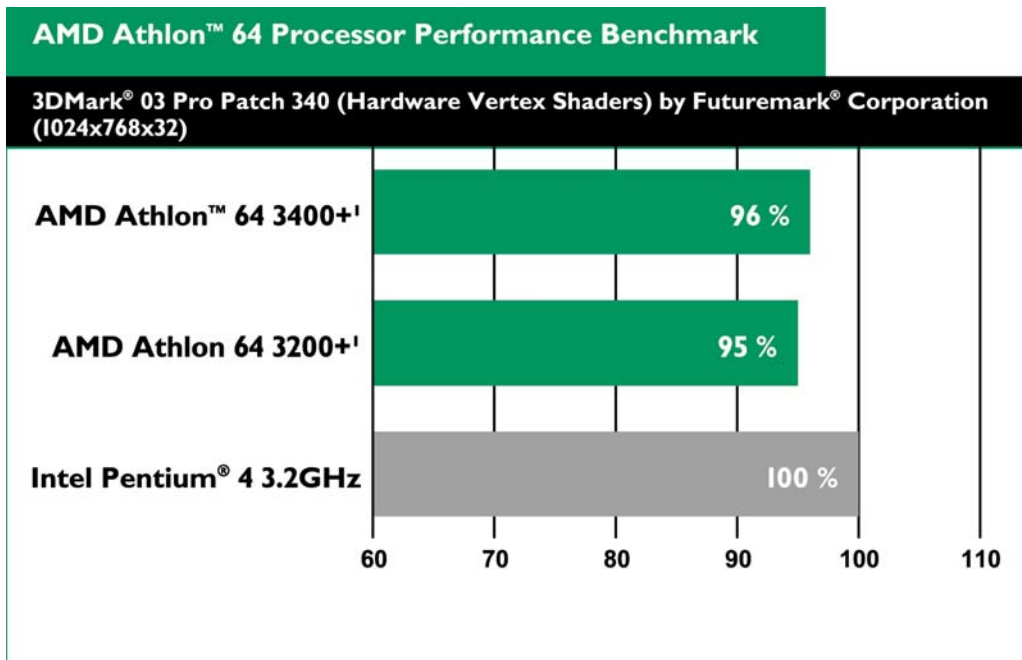
3DMark® 03 Pro (Software Vertex Shaders) by Futuremark® Corporation



¹This model number indicates relative software performance among AMD processors.

3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

3DMark® 03 Pro (Hardware Vertex Shaders) by Futuremark® Corporation

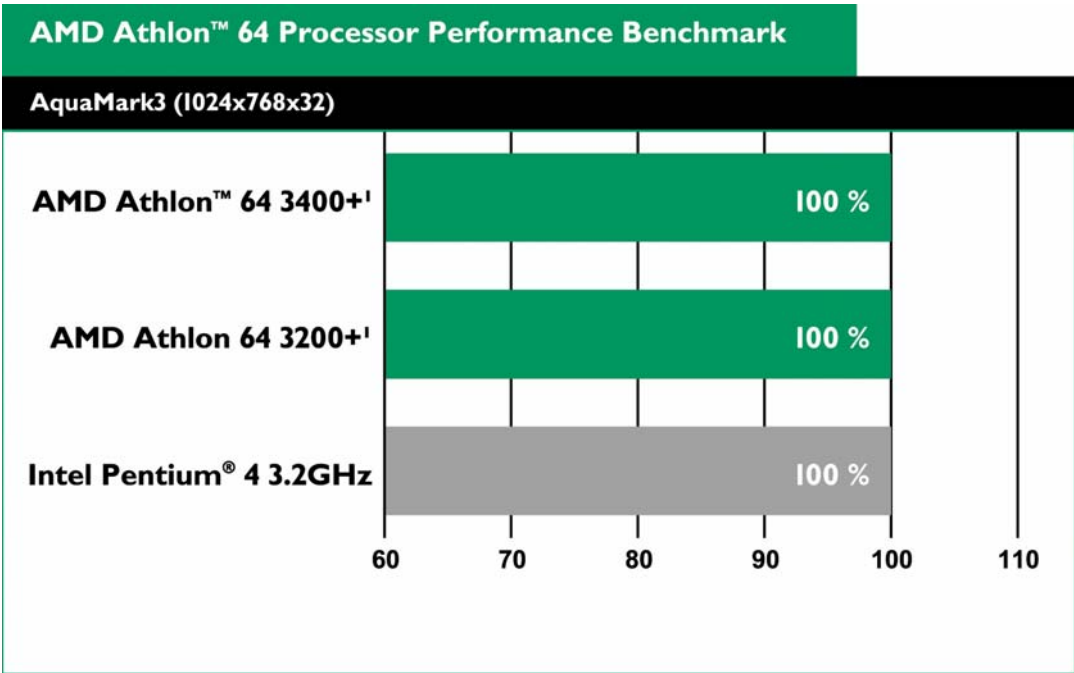


¹This model number indicates relative software performance among AMD processors.

3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

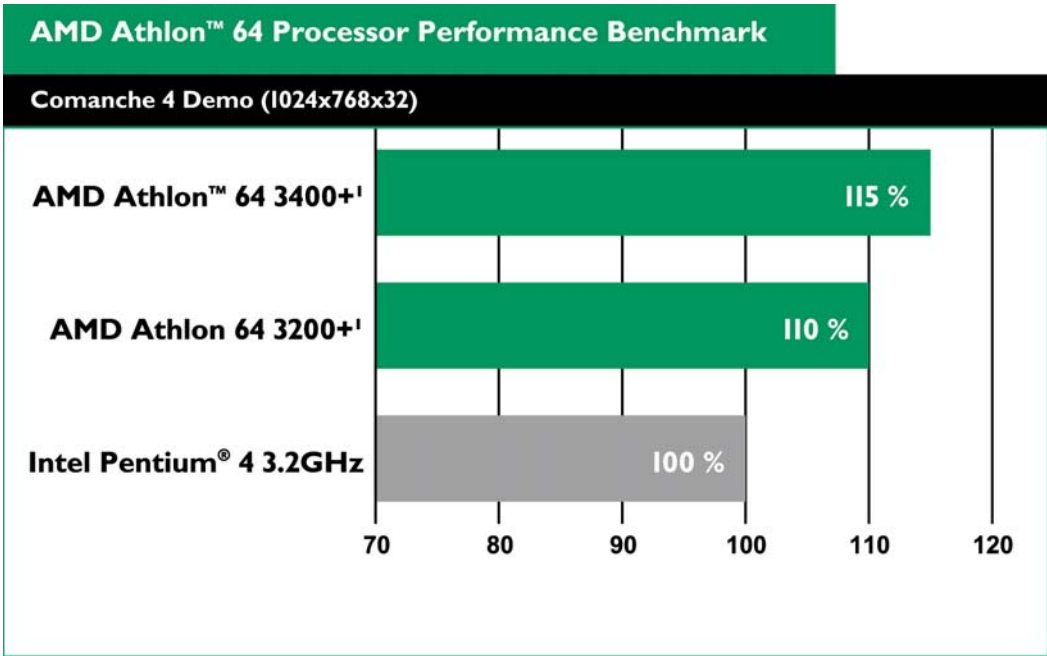
Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

AquaMark3



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

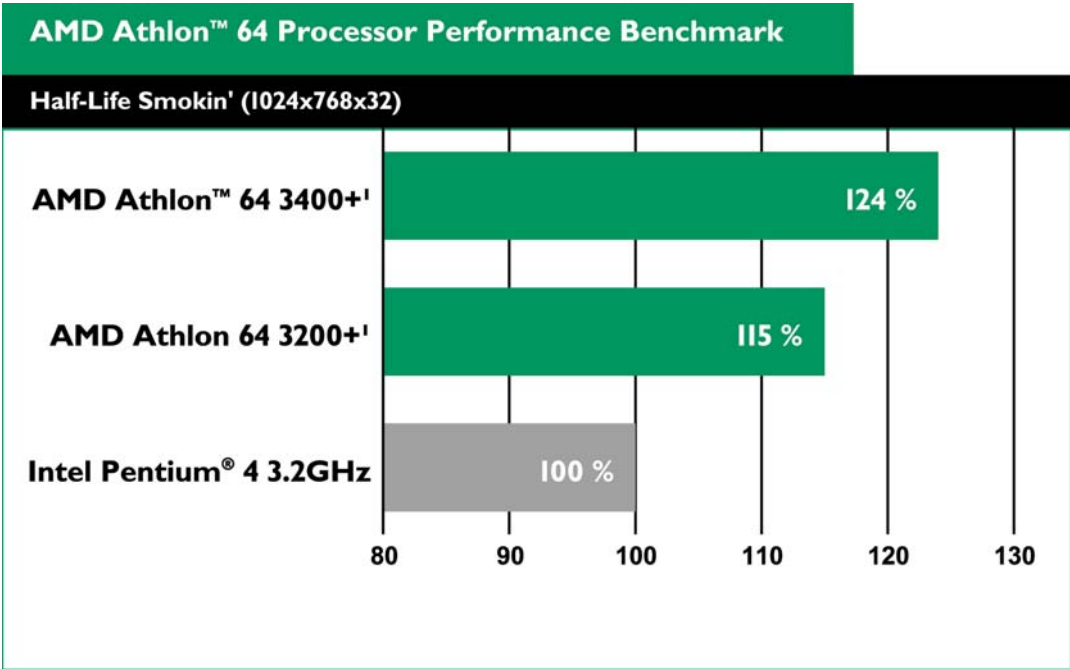
Comanche 4 Demo



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

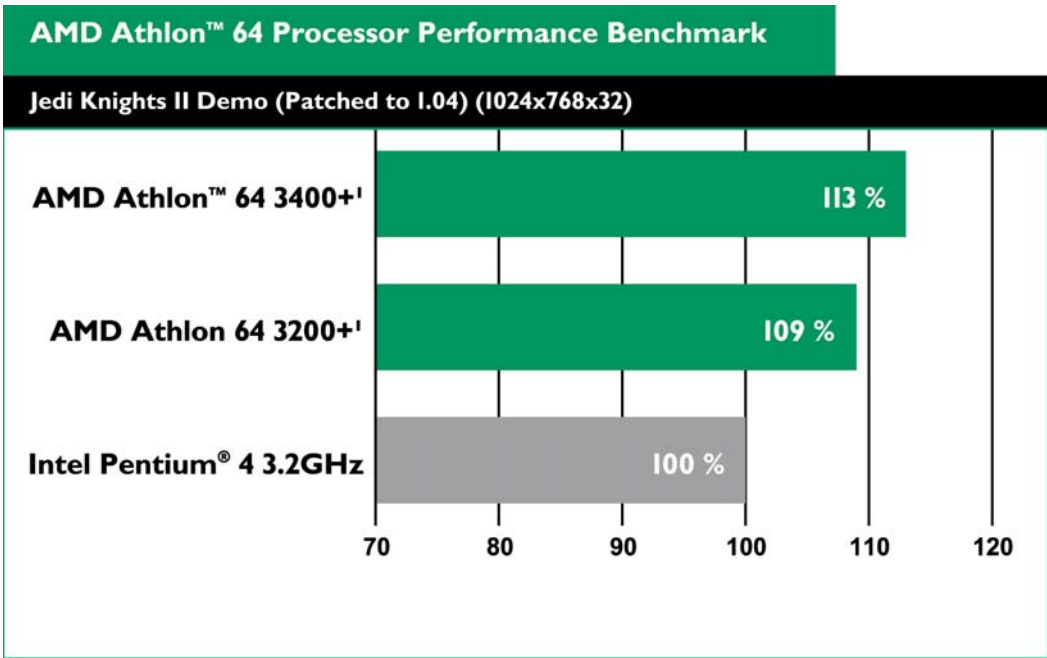
Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Half-Life Smokin'



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

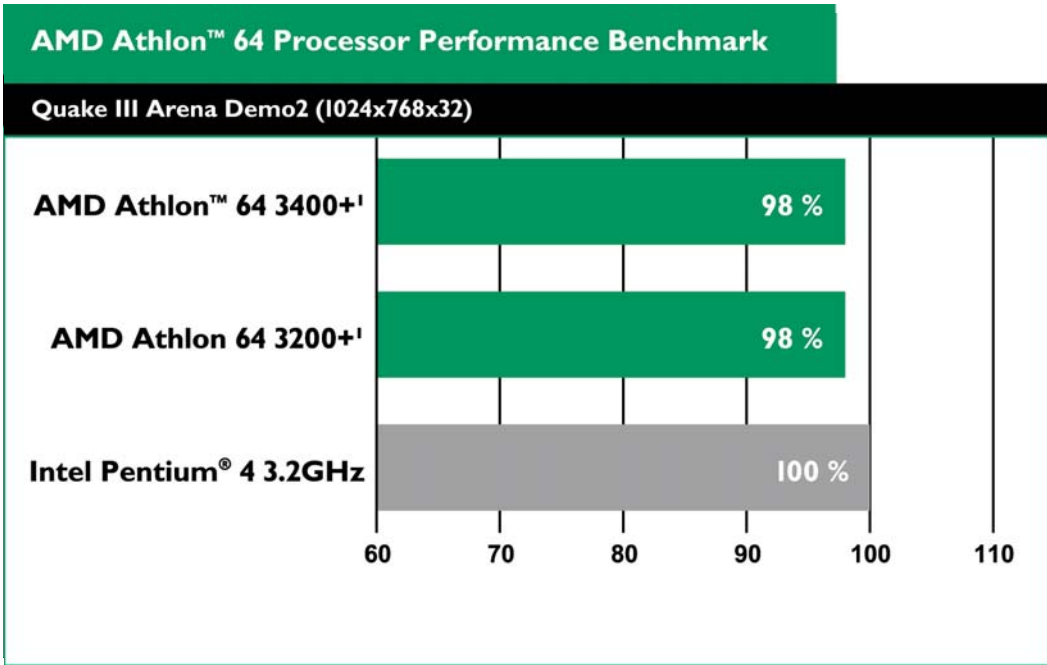
Jedi Knights II Demo



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

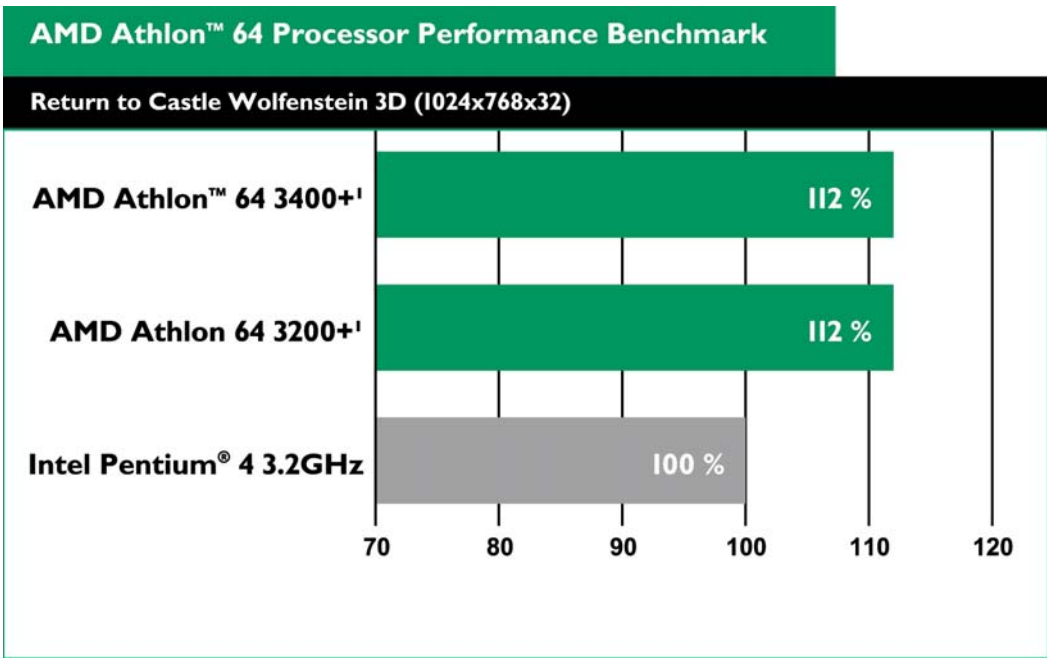
Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Quake III Arena Demo2



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

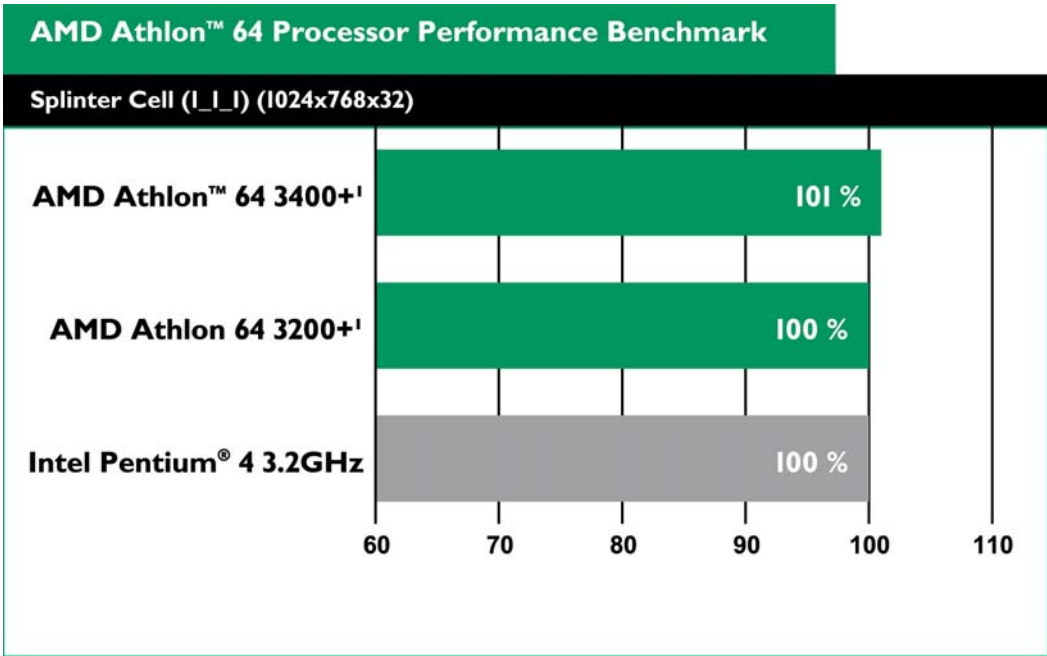
Return to Castle Wolfenstein 3D



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

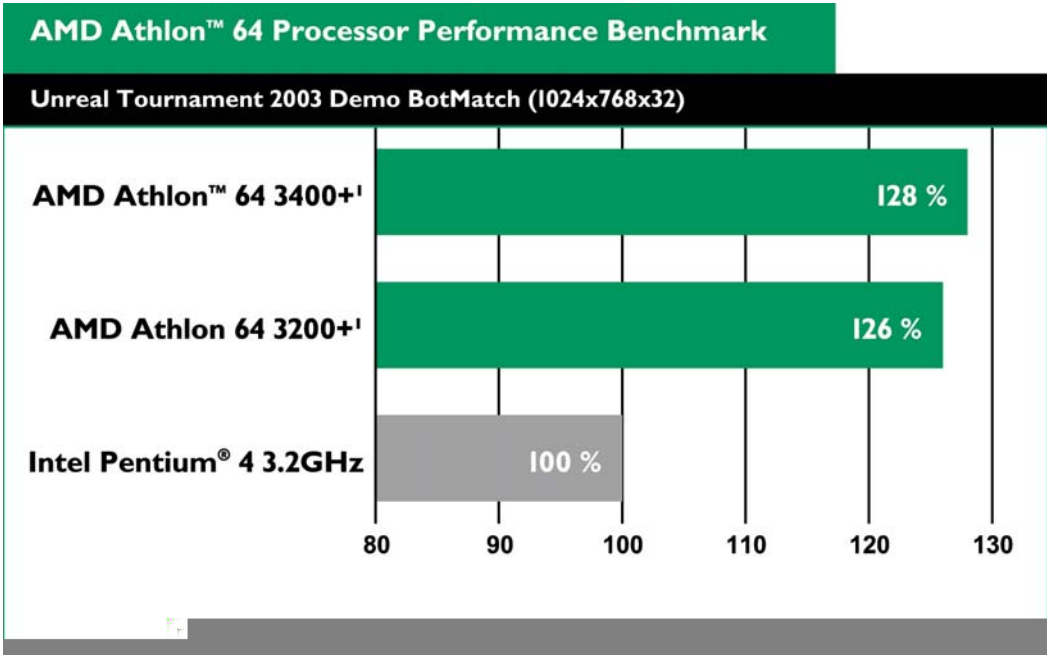
Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Splinter Cell (1_1_1)



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

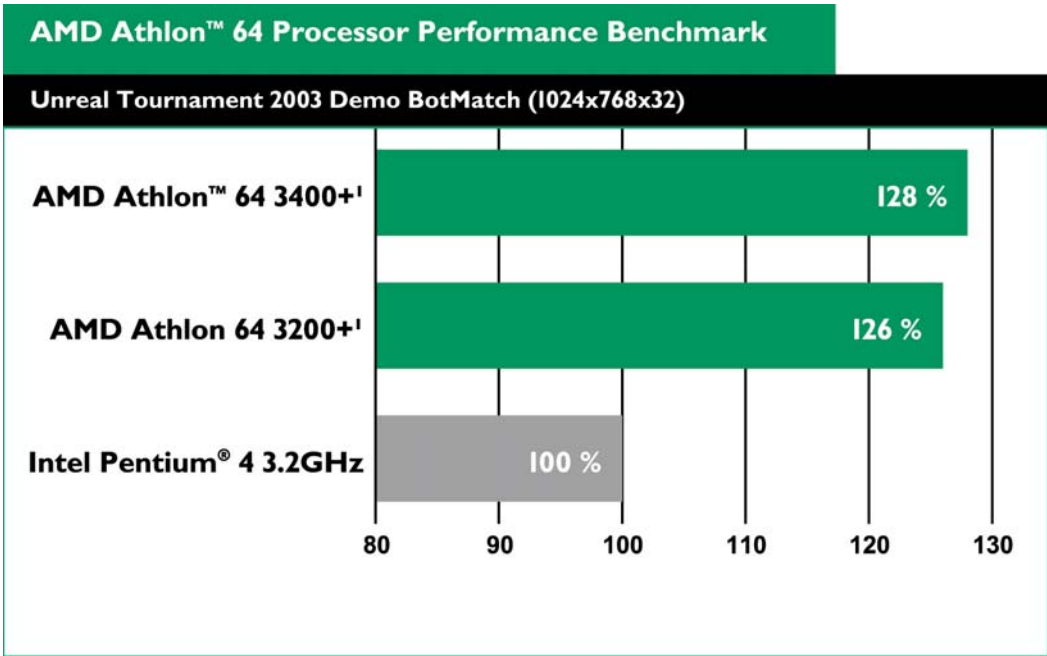
Splinter Cell (1_1_2)



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

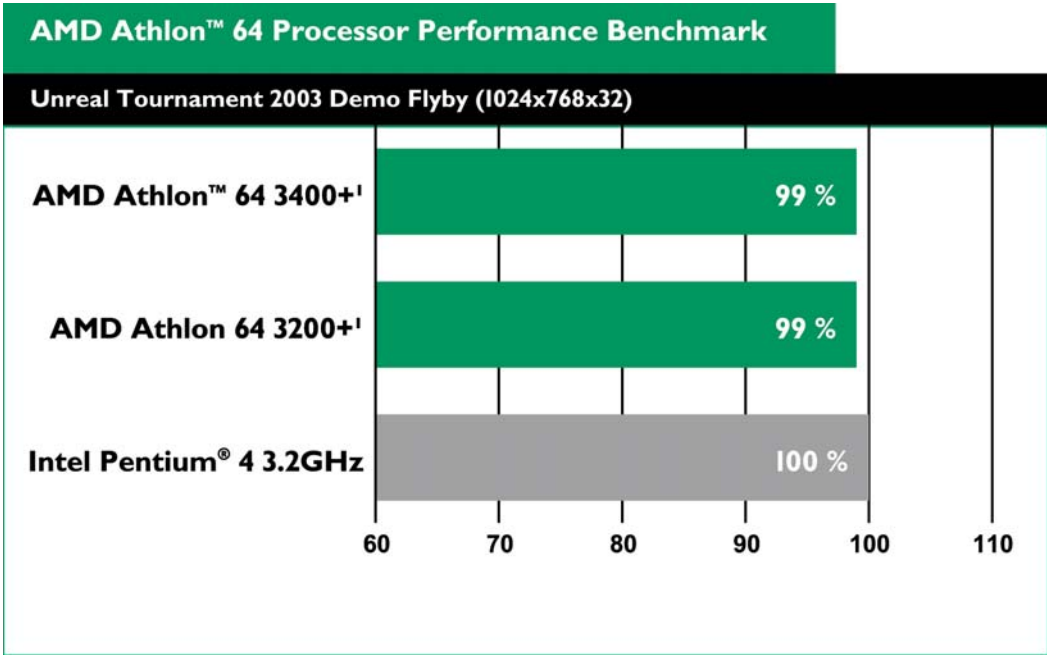
Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Unreal Tournament 2003 Demo BotMatch



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

Unreal Tournament 2003 Demo Flyby



¹This model number indicates relative software performance among AMD processors.
3D gaming may reveal limitations in the graphics solution and may not truly represent relative processor performance.

Refer to Table 1 on page 24 and Table 2 on page 25 for benchmark system configuration.

Benchmark System Configuration

This section describes the configurations that AMD used to perform the benchmarks. Table 1 and Table 2, on page 25 represent the system configurations used for this document.

Table 1. AMD Athlon™ 64 Processor for Notebooks 3400+ System Configuration

Component		Manufacturer and Model Description
Operating System		Microsoft® Windows® XP Professional, RTM, Service Pack 1a, Build 2600, DirectX 9.0a
Hardware	Processor	AMD Athlon™ 64 processor 3400+ ¹ AMD Athlon 64 processor 3200+ ¹
	Notebook	Winstron J8, BIOS version R01-A1H
	Chipset	VIA K8T800
	RAM memory	512 MB DDR SDRAM (PC2700/DDR333, CAS Latency 2.5)
	Hard drive	Hitachi HTS548040M9AT00, 40GB, 5400RPM, 8MB buffer, UDMA100 (NTFS used to format the hard disk)
	Video Card	ATI Mobility Radeon 9600, 64 MB video RAM
	Audio	VIA AC'97
	LAN	Broadcom NetXtreme Gigabit (disabled during test)
	Wireless LAN	Creatix CTX712 Wireless LAN (disabled during test)
Drivers	AGP	VIA version 5.1.0.3442, 7/2/2003
	IDE	Microsoft version 5.1.3597.0, 7/1/2001, DMA enabled
	Video	ATI version 6.14.10.6378, 8/12/2003, 1024x768x32, 85 Hz refresh rate
	Audio	VIA version 6.14.1.3850, 2/26/2003
	LAN	Broadcom version 5.33.0.0, 1/17/2003
	Wireless Lan	Creatix version 2.1.1.0, 11/26/2002

¹ This model number indicates relative software performance among AMD processors.

Table 2. Intel Pentium® 4 System Configuration

Component		Manufacturer and Model Description
Operating System		Microsoft® Windows® XP Professional, RTM, Service Pack 1a, Build 2600, DirectX 9.0a
Hardware	Processor	Intel Pentium® 4 3.2 GHz
	Notebook	Gateway M675, BIOS version 39.00.26
	Chipset	Intel 865PE
	RAM memory	512 MB DDR SDRAM (PC2700/DDR333, CAS Latency 2.5)
	Hard drive	Hitachi HTS548040M9AT00, 40 GB, 5400 RPM, 8 MB buffer, UDMA100 (NTFS used to format the hard disk)
	Video Card	ATI Mobility Radeon 9600, 64 MB video RAM
	Audio	SigmaTel C-Major
	LAN	Intel PRO/1000 (disabled during test)
	Wireless LAN	Broadcom 802.11g (disabled during test)
Drivers	AGP	Intel version 5.0.2.1002, 7/15/2003
	IDE	Intel version 5.1.2600.1106, 1/15/2003, DMA enabled
	Video	ATI version 6.14.10.6374, 7/19/2003, 1024x768x32, 85 Hz refresh rate
	Audio	SigmaTel version 6.14.1.4167, 9/17/2003
	LAN	Intel version 7.0.36.0, 3/11/2003
	Wireless Lan	Broadcom version 3.20.23.0, 6/13/2003

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